

**Housing For Protecting Flat Panel Display And Method For
Assembling Flat Panel Display And The Housing**

BACKGROUND OF THE INVENTION

1. Field of the Invention

5 The present invention relates to a housing for display and, more particularly, to a housing for flat panel display.

2. Description of Related Art

10 Currently, the flat panel displays are combined with many plastic or metallic frames outside the panel for protecting from impact or blocking light. For example, the liquid crystal display, as shown in FIG. 1, is often manufactured through assembling a backlight module 41 with a housing 44, a bottom frame 43, a liquid crystal display panel module 40, and a top frame 42 (i.e. a front bezel) together. However, this kind of assembly needs to waste a lot of time and material for manufacturing the
15 molds of housing and frames. This assembly increases the costs for manufacturing flat panel display and takes a lot of time for the coordination of molds manufacturers and panel assemblers. In addition, the conventional assembly of display panels and frames is not convenient to assemble or to disassemble. Moreover, the weight of the many frames
20 also increases the total weight of the whole flat panel display.

 Therefore, it is desirable to provide an improved assembly of the conventional assembly of the flat panel display and the method for assembling flat panel display and the protecting housing and frame to mitigate and obviate the aforementioned problems.

SUMMARY OF THE INVENTION

The object of the present invention is to provide a housing for protecting a flat panel display to fix the location of the display panel and/or the backlight module and reduce the number of moldings or save
5 time and cost required for making said housing.

Another object of the present invention is to provide a light housing to reduce the total weight of the combined assembly of said housing and the display panel and/or the backlight module, and to easily assemble or disassemble the combined assembly of said housing and the
10 display panel and/or the backlight module.

Another object of the present invention is to provide a flat panel display with low weight, low cost and simple assembly of housing.

Another object of the present invention is to provide a simple method to assemble the display panel and/or the backlight module and the housing, and further to reduce the weight of the combined assembly
15 of the display panel and/or the backlight module and the housing.

To achieve the object, the housing for protecting a flat panel display and/or a backlight module of the present invention comprises: a rear blade, a front blade, and a side blade wherein said side blade is
20 integrated with and sandwiched between said front blades and said rear blades to form a frame having a cross-section in a shape of "U", and said frame is allowed to fold to surround the partial or the whole edge of said flat panel display and/or a backlight module.

The flat panel display of the present invention comprises: a
25 display panel; and backlight module, comprising: a rear blade, a front

blade, and a side blade wherein said side blade is integrated with and sandwiched by said front blades and said rear blades to form a frame having a cross-section in a shape of "U", and said frame is allowed to fold to surround the partial or whole edge of said flat panel display and/or a backlight module.

The method for assembling a flat panel display, comprising following steps: (A) providing a flat panel display or a backlight module, and a housing for protecting a flat panel display and/or a backlight module, comprising: a rear blade, a front blade, and a side blade wherein said side blade is integrated with and sandwiched by said front blades and said rear blades to form a frame; and (B) folding or bending said frame to surround at least part of the edge of said flat panel.

Other objects, advantages, and novel features of the invention will become more apparent from the following detailed description when taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of the conventional assembly of housing and the liquid crystal display panel.

FIG. 2 is a perspective view of the frame of the present invention.

FIG. 3 is a perspective view of assembly of the liquid crystal display panel, the backlight module and the folded frame of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

The housing for protecting a flat panel display and/or a backlight module of the present invention comprises: a rear blade, a front blade, and a side blade wherein said side blade is integrated with and sandwiched between said front blades and said rear blades to form a frame having a cross-section in a shape of "□", and said frame is allowed to fold to surround the partial or the whole edge of said flat panel display and/or a backlight module.

The housing of the present invention for protecting flat panel display can be used for protecting display panels or a display panel with integrated IC chips and PCB boards. The backlight module in the present invention includes a integrated combination of light guides, light sources (e.g. LED or CCFL), diffuser sheets and other optical films. The flat panel display of the present invention is not limited. Preferably, the flat panel display panel is liquid crystal display panel or organic light emission display panel. The size of the flat panel display of the present invention is not limited, either. The method for manufacturing the housing of the present invention is not limited. Preferably, the housing of the present invention is made by inject molding or extrusion molding.

The inner surface of the frame of the present invention can be attached with any functional parts for additional function. Preferably, a plurality of separate blades can be attached on the surface of the inner surface of the frame. Most preferably, the separate blades are parallel to the face blades

either. Preferably, the number of layer of the separate blades is one. The length of the frame of the present invention is not limited. The length of the frame of the present invention can be adjusted to meet the size of the display panel. Preferably, the length is equal to or greater than the perimeter of the display panel. The frame of the present invention can be selectively arranged additional parts for additional function. Preferably, at least a binding unit is mounted or arranged on the surface of the side blade. The binding unit on the frame of the present invention is not limited. Any conventional binding unit can be applied or arranged on the frame of the present invention. Preferably, the binding unit is clips, hooks, male/female locking unit, screws, bolt, a combination of a tenon and a groove, or glues. Conventional adhesives or tape with adhesives can be selectively added to the binding unit to help binding unit for better binding to keep the frame closed. The location of the binding unit on the frame is not limited. Preferably, the binding unit is arranged at the ends of the frame. The location of the cuts on the surface of the face blades of the frame is not limited. Preferably, the cuts locate at the bending or folding position of the frame to meet the corner of panel. The shape of the cuts on the frame is not limited. Preferably, the cuts on the frame are V-cuts. The number of the cuts is not limited. Preferably, more than 3 cuts is arranged on the frame of the present invention. At least an opening for electric cable can be selectively arranged on the frame of the present invention. Preferably, one opening is arranged on the frame of the present invention to extend cable for power or transmission of signals. The material of the frame of the present invention is not limited. Preferably, the frame of the

present invention is made by dark plastic or metal. The inner edge of the frame of the present invention will define a central open window for the active area for display images after the frame is folded and closed.

With reference to FIG. 2 and FIG. 3, there is shown a housing for flat panel display of the present invention. The housing shown in FIG. 2 is used to surround a liquid crystal display panel 40 and a backlight module 41. The housing is formed by folding a linear frame 10 having a cross-section in a shape of "U". The foldable frame 10 is consist of a pair of linear face blades 11 and a linear side blade 12 which is sandwiched between said two face blades 11 (the front blade and the rear blade). Furthermore, the surface of side blade 12 is perpendicular to the surfaces of the face blades 11. The two ends of the frame 10 are connected through a binding unit after folding to form a closed housing for surrounding at least the edges of the liquid crystal display panel 40 and the backlight module 41. In the present example, the binding unit on the frame 10 is a combination of hook 20 and a groove 21. The inner edge of the closed frame 10 defines a central open window for the active area for the liquid crystal display panel 40 to display words and images. On the inner surface of said side blade 12, several separate blades 14 locate to fix the position and limit the movement of the flat panel display 40 and the backlight module 41. In the present invention, the separate blades 14 are parallel to the face blades 11. Moreover, on the surface of the face blades 11, a plurality of V-cuts 13 is formed. In the present example, three V-cuts can be found on the face blades 11. The V-cuts 13 on the face blades 11 (either front blade or rear blade) of the frame 10 preferably

locate on the position for future folding to ease the folding of the frame 10. Most of the time, said frame 10 of the present invention is made of materials that can block the light. In the example, the frame 10 is made of a dark plastic. In addition, an opening 30 is arranged on the surface of the side blade 12. The opening 30 on the side blade 12 of the frame 10 can ease the arrangement of a electric cable (fro example, an FPC) for connecting the outside processor and said flat panel display 40 and/or said backlight module 41 inside said housing as the frame is folded to be closed (referring to FIG.. 3).

10 When the housing is applied, one side edge of the liquid crystal panel and/or the backlight module is placed in the ditch or groove of the frame 10, then the frame is folded to surround the whole peripheral edge of the liquid crystal panel and/or the backlight module. The inner edge of the closed frame defines a central open window to allow the active area of the liquid crystal display panel to display images.

By using the housing of the present invention, only one housing is required. Furthermore, only one mold for making the housing for the flat display panel is needed. Compared with conventional housing assembly for protecting the flat panel display (e.g. liquid crystal display panel), less parts is required. In addition, compared with conventional method for making the housing assembly, less molds is to be made. And, of course, less time and less cost for making molding is taken. The housing of the present invention is easy to be made and assembled. On the other hand, since only one part (i.e. the frame of the present invention) is needed in the housing of the present invention, the assembling and taking-out of the

flat display panel and the housing can be achieved very easily and quickly. In addition, since only one part is required for the housing of the present invention is also comparably light. Therefore, compare with conventional flat panel display devices, the weight of the flat panel display integrated with the housing of the present invention is light. The housing of the present invention can be produced through any kind of conventional methods. Preferably, the housing of the present invention is made by inject molding. By using the housing of the present invention, the assembly of the flat panel display can be simplified, the cost and the time for manufacturing the molds for the housing can be well saved. Therefore, the housing and the method for assembling the housing of the present invention is novel, simple and non-obvious.

Although the present invention has been explained in relation to its preferred embodiment, it is to be understood that many other possible modifications and variations can be made without departing from the spirit and scope of the invention as hereinafter claimed.